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ABSTRACT

This publication provides information on the most important indoor mold-related health concerns and discusses how school districts can keep school facilities mold-free and avoid these problems. The document addresses when to be concerned, how molds cause health problems, symptoms caused by mold allergies, indoor molds that form toxins, who is most at risk, and basic voluntary guidelines for cleanup and prevention of all molds. (EV)

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National Clearinghouse for Educational Facilities

The California Department of Health Services
March 2002

When any building material or furnishing is damp for more than 48 hours, mold may grow. Many schools have experienced water damage in buildings because of roof or plumbing leaks, floods, and poor drainage of rainwater runoff or landscape irrigation. Damp buildings support mold growth and other biological contaminants that may cause health problems for some adults and children. This publication provides information on the most important indoor mold-related health concerns, and it discusses how school districts can keep school facilities mold free and avoid these problems.

When to Be Concerned

Mold fragments and spores (the microscopic reproductive units of molds) are present everywhere on earth—in air and dust, both indoors and outdoors. Mold grows in buildings if the indoor air is very damp or if there have been water leaks. You may suspect that mold is present if you see visible growth or if you smell moldy odors. Exposure to mold may affect the health of both children and adults. The severity of the health effect depends on factors such as the amount and type of mold, how close the person is to areas of mold growth, how much time he or she spends in the building, and the person's susceptibility to mold's effects. Indoor air quality experts agree that buildings that contain visible mold or moldy odors increase the risk of health problems. Molds should be removed from buildings promptly, using methods that protect the safety and health of the occupants and the staff performing the cleanup.

How Molds Cause Health Problems

Molds usually cause adverse health effects when they are inhaled in large numbers. The number of mold fragments or spores needed to cause health problems is unknown and varies from person to person. Some people report no problems even in very moldy environments; persons who are allergic to molds may respond to just a very few spores. Besides inhalation, people can become exposed to mold through skin contact and food. Some molds also produce compounds called *toxins* or *mycotoxins*. In high concentrations, these compounds may cause symptoms even in individuals who have no allergies.

What Are the Symptoms?

The following symptoms may be caused by mold allergies:

- nasal or sinus congestion
- sensitivity to light
- sneezing
- sore throat
- cough
- skin irritation (rash or itching)
- shortness of breath
- headache
- watery, reddened, or burning eyes
- fatigue

What about Indoor Molds That Form Toxins?

Many species of mold (including some that grow indoors) can produce chemicals that are toxic to other microorganisms. These compounds help molds compete in nature for food and other resources. Some of these toxins also affect people. Symptoms that have been attributed to mold toxin exposure include fatigue, nausea, diarrhea, headache, and eye, skin, and respiratory irritation. Many of these symptoms have been described in studies of moldy buildings, but a cause-and-effect relationship has not been proven. All of the reported symptoms are non-specific and can be caused by many other health conditions. Therefore, it is very difficult for physicians and researchers to determine whether specific symptoms are tied to mold exposure.

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Who Is Most at Risk?

Infants, toddlers, children, the elderly, those with compromised immune systems, and people with existing respiratory conditions such as allergies or asthma tend to have a higher risk for health problems from elevated levels of mold spores. Damp buildings and mold growth are recognized triggers of asthma attacks.

Can medical tests identify mold allergies? Current tests can identify allergies to fewer than ten of the hundreds of molds that can grow indoors. Therefore, students or staff may have mold allergies that a doctor cannot accurately diagnose with an allergy test.

Is there a test that will indicate whether students or staff have been exposed to mold toxins? No, there are no blood, urine, or other medical tests that can determine whether someone has been exposed to a mold toxin. Researchers and laboratories are working to develop such tests, but none has yet been shown to be accurate.

Is there a test that will indicate whether students or staff have been exposed to molds inside school buildings? No. The allergy tests mentioned above may identify people who are hypersensitive to molds. However, there is no medical test that can accurately determine where or when people were most recently exposed to the molds that activate their allergies. People encounter high levels of airborne mold spores in many places, for example, when gardening, mowing lawns, playing outdoor sports, hiking, or camping.

Is it important to determine if the mold in my school is toxic? No. It is not necessary to know if toxins are present. What is important is to take appropriate action to clean up molds.

There are no readily available tests that can determine if a mold growing in a school building is producing toxins. Laboratory studies show that many molds have the ability to produce toxins, but that they do not always do so. Whether a mold produces a toxin in a building may depend on the material on which it is growing, building conditions (such as temperature or humidity), and other microorganisms that may be present.

What about classrooms with sick children or teachers but no visible mold? Symptoms of mold exposure are similar to symptoms of many other illnesses, including colds, flu, and hay fever from pollen. Animal danders from classroom pets or from classmates bringing in pet allergens on their clothing may also cause symptoms seemingly related to the school alone. Factors not related to the environment, such as headaches from low blood sugar or caffeine withdrawal, may contribute to classroom symptoms. In the situation where teachers or students experience symptoms associated with poor indoor air quality in specific rooms, but then feel better when they are off campus, facilities personnel should inspect these rooms in particular for all sources of poor indoor air quality (of which hidden mold may be one). Other environmental sources of poor indoor air quality include:

- closed or blocked fresh-air intake vents
- clogged or missing ventilation system filters
- artwork covering room thermostats
- delivery trucks or school buses idling beside fresh air intakes

Basic Voluntary Guidelines for Cleanup and Prevention of All Molds

When school buildings get wet (because of rain or a clean water spill):

Do:

- dry building materials and furnishings as rapidly as possible (within 48 hours to prevent the initiation of mold growth) by:
  - bringing in portable fans to increase air circulation and speed the drying process;
  - pulling up edges of wall-to-wall carpet to allow increased air circulation (if carpet is very dirty, old, damaged, or cannot be dried within 48 hours, consider discarding it);
  - running fans continuously until materials are dry, and;
  - if the room has flooded to a depth of greater than one inch, removing baseboards and drilling holes through the bottom of the drywall to improve wall cavity drying.

Do Not:

- close up the room and turn on the heater (this will only increase the likelihood of mold growth).

If buildings are flooded by dirty water or sewage:

Do:

- contact professional consultants for appropriate cleaning and disinfection methods.

Getting rid of mold growth inside a school building:

Do:

- find the source of water intrusion, leakage, or water vapor accumulation and correct it. If the moisture source is not eliminated, the mold will grow back;
- remove mold appropriately. Disinfection alone (with bleach or other chemicals) is not recommended because it does not remove the potential source of health problems: the mold spores and fragments. California Department of Health Services staff recommend that school facility personnel adopt the guidelines for mold cleanup and removal produced by the U.S. Environmental Protection Agency (U.S. EPA) or the New York City Department of Health (available at their websites, see Resources). These guidelines provide assistance in determining whether school maintenance personnel can safely remove or clean moldy materials or if specially trained individuals should be consulted. The recommendations in these two guidelines protect the health of building occupants regardless of the type of mold. When visible mold is present, an extensive and costly testing protocol is not required. Rather, schools can use their limited financial resources more effectively in identifying and correcting the water problem and remediating visible mold growth.

Do Not:

- paint over mold on walls, ceilings, or floors. Instead, clean off or remove the mold by following U.S. EPA or New York City Department of Health guidelines;
- attempt to clean or disinfect moldy wall-to-wall carpet. If it has a moldy odor or mold is visible on its top or bottom surface, it should be replaced.

Preventing mold growth in schools:

Do:

- rapidly respond to water leaks by fixing them or preventing water entry into buildings;
- dry wet building materials and furnishings within 48 hours, if possible;
- ensure that mechanically ventilated rooms are run on continuous ventilation (rather than temperature demand control) when they are occupied;
- establish a regular schedule for inspecting roofs, ceilings, walls, floors, and carpeting for water leakage and mold growth or moldy odor;
- replace water-damaged materials.

Do Not:

- allow water from landscape sprinklers to strike buildings;
- site portable classrooms over areas where water can collect;
- use carpet in entryways to classrooms that have direct outdoor access. If carpets are in place in such classrooms, supply waterproof mats over carpeted entryways for drying of clothing and umbrellas.

Communicating with parents and staff:

Do:

- develop an *Indoor air quality protection policy* for your school before there are problems. The U.S. EPA's *Indoor Air Quality Tools for Schools* program can be implemented for little or no cost and can help districts involve everyone in maintaining good classroom indoor air quality;
- respond promptly to staff or parental concerns about water leakage, mold growth, or unusual illnesses in classrooms;
- admit the presence of a water leak or mold growth if such a situation is encountered, and be honest, frank, and open when discussing school facilities and potential environmental health issues;
- inform the school community of steps being taken to correct the problem, and set a date when remediation is expected to be complete;
- release and discuss information found during classroom inspections (especially reports from external consultants) as rapidly as possible, and consider using the school website for this purpose;

- involve parents and staff in discussions about prioritizing facility repairs if large expenditures are necessary and remediation cannot be done immediately;
- encourage small group discussions or one-to-one question and answer sessions rather than large public meetings. Smaller groups are more likely to produce viable options for managing the current situation.

Do Not:

- withhold information such as consultant reports or remediation plans from the school community while second opinions or technical reviews are being conducted.

Concerned organizations, parents, and others are encouraged to work with school administrators and school board members on indoor mold issues or other environmental conditions that they believe may be affecting student or teacher performance or health.

Resources available to assist schools in maintaining good indoor air quality: Many water intrusion problems can be corrected and potential cases of mold growth prevented with timely maintenance and repairs by school district staff. In this regard, we heartily recommend the U.S. EPA's *Indoor Air Quality Tools for Schools Action Kit*, which is a free do-it-yourself guide to implementing a total indoor air quality program for individual schools. This program has been useful in many school districts by helping participants recognize situations that can lead to mold growth or other indoor air problems and either avoid or quickly address them.

Resources

New York City Department of Health. 2002. *Guidelines on Assessment and Remediation of Fungi in Indoor Environments.*
http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html

U. S. Environmental Protection Agency. 2001. *The Indoor Air Quality (IAQ) Tools for Schools Kit.*
http://www.epa.gov/iaq/schools/tools4s2.html

U. S. Environmental Protection Agency. 2001. *Mold Remediation in Schools and Commercial Buildings.*
http://www.epa.gov/iaq/molds/

For general information about molds and health, as well as cleanup recommendations, see these websites:

California Environmental Health Investigations Branch. Mold.
http://www.dhs.ca.gov/ps/deodc/ehib/EHIB2/topics/mold.html

California Indoor Air Quality Program.
http://www.cal-iaq.org/

Additional Information

See the NCEF resource lists *Hazardous Materials* and *Indoor Air Quality* online at *http://www.edfacilities.org/rl/*

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